

APPENDIX A

SCALES

The Deuterios, Pl. Deuterios and Nenano modes belong, according to the modern system of Byzantine music, to the chromatic genus, which uses smaller intervals of halftones and larger ones of three-half-tones.

The existence of the chromatic genus during the Middle Ages constitutes one of the greatest problems for research in Byzantine music, which up to the present has not been properly answered.

Since the melodies examined belong to the above modes, it was natural, during the progress of my research, to concern myself with this subject. Unfortunately, the variety and magnitude of problems involved in a formulaic analysis of the melodies gave me no opportunity to deal with this problem as I would have wished.

In spite of this, I tried as far as possible to gather from my material such information as in my opinion might assist in solving this problem. From a consideration of all the information gathered I confirmed that MSi and MeSi could be used as a sound basis from which useful conclusions could be derived. After this, I recorded all the MSi and MeSi in my material. I verified their place and function within the melodies, and, finally, I compared them with corresponding ones from later manuscripts and from the modern system of Byzantine music.

I have avoided mention or criticism of previous theories and ideas on this problem for two reasons:

a) I have not attempted to present a complete study of this subject, since this would have necessitated recourse to a great

ter number of sources, and taken up time which, regrettably, I did not have at my disposal.

b) I have attempted to present only such conclusions as were in the course of my research, and, in particular, to indicate the method used, which, as I believe, enables one to confront the problem from a new point of view.

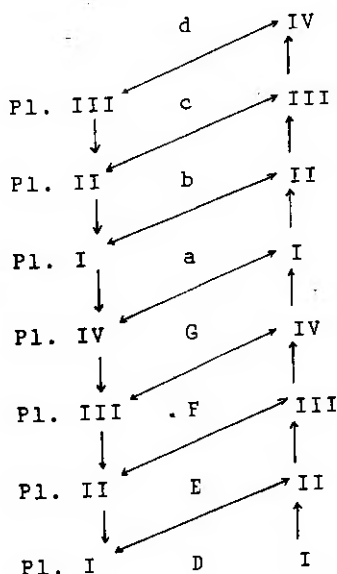
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The surviving theoretical works on Byzantine music agree in stating, as regards the modes, that ascending from the first mode we find the Authentic modes while we find the Plagal ones by descending. Thus, for example, the Codex Barberinianus Gr. 300 provides the following explanation¹:

Ἀπό τόν πρῶτον ἦχον ἄν κατέβεις μίαν φωνήν, εἶναι ὁ πλάγλιος τοῦ τετάρτου· καί ἀπό τόν πλάγιον τοῦ τετάρτου, ἄν ἀνέβεις μίαν εἶναι πρῶτος· καί πάλιν ἀπό τόν πλάγιον τοῦ τετάρτου ἄν κατέβεις μίαν, εἶναι βαρύς καί ἀπό τόν βαρύν ἄν ἀνέβεις μίαν, εἶναι τέταρτος· καί πάλιν ἀπό τόν βαρύν ἄν κατέβεις μίαν, εἶναι πλάγιος τοῦ δευτέρου καί ἀπό τόν πλάγιον τοῦ δευτέρου, ἄν ἀνέβεις μίαν εἶναι τρίτος· καί ἀπό τόν τρίτον ἄν κατέβεις μίαν εἶναι πάλιν πλάγιος τοῦ δευτέρου· καί ἀπό τόν πλάγιον τοῦ δευτέρου, ἄν κατέβεις μίαν, εἶναι πλάγιος τοῦ πρώτου· καί ἀπό τόν πλάγιον τοῦ πρώτου ἄν ἀνέβεις μίαν εἶναι δεύτερος· καί ἀπό τόν δεύτερον, ἄν ἀνέβεις μίαν εἶναι τρίτος· καί ἀπό τόν τρίτον ἄν ἀνέβεις μίαν εἶναι τέταρτος· καί ἀπό τόν τέταρτον ἄν ἀνέβεις μίαν εἶναι πρῶτος.

1. Lorenzo Tardo, *L'Antica melurgia bizantina*, Grottaferata (1938) p.158. See also Γρ. Σιδῆη, *Ἡ παλαιά βυζαντινὴ σημειογραφία καί τὰ προβλήματα τῆς μεταγραφῆς τῆς εἰς τὸ πεντάγραμμον, Βυζαντινὰ, Τόμος 7ος*, Θεσσαλονίκη 1975, p.203.

The above description yields the following diagram :



Referring to the problems of transcribing Byzantine melodies into Western notation Jorgen Raasted¹ states that: "Transcriptions of Byzantine melodies into western notation are based on the assumption that medieval Byzantine chant consists of tones and half-tones only. The diatonic character of Byzantine music has been postulated by WELLESZ and TILLYARD from the early days of their studies, and their position -which lies behind such work as that done in Monumenta Musicae Byzantinae and that of the Grottaferrata school- has since then found support in observations made by a number of scholars"

Now, in my opinion the succession of modes on the degrees of the diatonic scale shows the position of the modes, but, not their scales². For instance, the Protos mode occurs between the Plagal Tetartos and Deuterios modes, but how the intervals of its scale were arranged or according to what system (tetrachord pentachord, octave...) it proceeds is not at all clear. In all probability this was indicated by means of the ἀνάχνημα.

Consequently the possibility of the existence of a chromatic

1. Jorgen Raasted, Intonation Formulas and Modal Signatures in Byzantine Musical Manuscripts, Copenhagen 1966. p.7

2. Χρυσοῦδης, Θεωρητικόν μέγα τῆς μουσικῆς, Trieste, 1832 p.130.

and an enharmonic genus before the reformation of 1818 must be investigated with due attention.

In an "Anthology" which must have been written at the beginning of the 18th c. there is a doxology by Petros Lampadarios in the Plagal Deuterios mode.¹ The same doxology is found in more recent books of Byzantine music, transcribed according to the new system and in the chromatic Plagal Deuterios mode.² This demonstrates that the chromatic Plagal Deuterios mode was in use already at the time of Petros Lampadarios (18th c.) and that the distinction into three genera was not an invention due to the three teachers of the new method.

But the fact that Petros Lampadarios writes melodies in a chromatic genus must, I submit, mean that the genus in question was already recognized at the time and that its roots must be sought in a more ancient period. As a matter of fact, the Προκαταδεῖται τῶν κατὰ δεικνῶν and other theoretical writings on Byzantine music contain references to the existence of "phthorika mele" already from the 12th c. and onwards, and they add tables of the "phthoric" signs.³

With this background in view I have tried to ascertain whether the melodies under consideration contain elements which prove, or at least indicate, that the modes in question were chromatic at the time. The results of my investigations are presented below.

The use of MeSi in the investigated melodies of the modes Deuterios, Plagal Deuterios and Nenano appears from the following table:

D	E	F	G	a	b	c	d
πῆ	πῦ		ῦ πῦ	ῦ πῦ	ῦ πῦ	πῦ	πῦ
				πῦ			

1) Ἀνθολογία τῆς μουσικῆς περιέχουσα κατὰ τάξιν συλλογὴν τινα μαθημάτων τῶν ἀναγκασιωτέρων τῆς ἐκκλησιαστικῆς ἀκολουθίας (in the possession of J. Raasted), f. 108v-113r.

2) Πανδέκτη, Ἐν Κωνσταντινουπόλει (αὐτὸς): Τόμος 2 pp. 687-695.

3) Γρ. Στάθη op. cit: pp. 199-201

The table shows that:

a) The named modes use a common system of MeSi having as basic points of support i) the element γ (developed from the minuscule β and ii) the element $\underline{\gamma}$ or $\underline{\gamma}$ i.e. the Nenano.

b) The γ , either alone or accompanied by the π (=πλδγτοζ), occurs on the notes E, G, b.

c) The element $\underline{\gamma}$ or $\underline{\gamma}$ is always found on an \underline{a} , where later manuscripts have σ (the phthora of the Nenano).

d) The remaining MeSi, viz. $\pi\gamma$ (12 cases), δ (4 cases), and $\underline{\gamma}$ (1 case) belong to uthur modes and probably introduce some kind of modulation into these modes.

In view of the above observations I shall advance two hypotheses:

a) The scale of the modes Deuterios, Plagal Deuterios and Nenano is diatonic.


b) The element γ whether used by itself or in combination with the abbreviation π (=πλδγτοζ) has the same implication.

If these hypotheses are accepted the scale can be tabulated as follows, with the MeSi placed at the corresponding positions:

E	F	G	a	b	c	d	e
half-tone	tone	tone	tone	half-tone	tone	tone	
$\pi\gamma$		γ $\pi\gamma$	γ $\underline{\gamma}$ $\underline{\gamma}$	γ $\pi\gamma$		$\pi\gamma$	

It appears from the above figure that the element γ is found on E and b, that is on degrees of the scale above which there is a half-tone.

The same element, γ , is furthermore encountered on G, but

the interval G-a is a tone. Given that this element, according to hypothesis (b) carries the same implication wherever it occurs, the interval G-a must be a half-tone. The conclusion is supported by the fact that on a we find the MeSi  which in later manuscripts takes the form ρ, and today the interval under it requires a half-tone.

This being so we must, in order to create the half-tone, accept either G-sharp or a-flat.

First possibility: G-sharp

Accepting G-sharp we must correspondingly have d-sharp in the high tetrachord. The scale will then be:

S_c_a_l_e_A:

E	F	G#	a	b	c	d#	e
half-tone	three half-tones	half-tone	tone	half-tone	three half-tones	half-tone	

This scale consists of two similar tetrachords E-a and b-e separated by the tone a-b.

A comparison¹ of this scale with that of the Pl. Deuterios of the modern system of Byzantine music² yields the following results:

π	β	Γ	Δ	ς	ζ	υ	φ
half-tone	three half-tones	half-tone	tone	half-tone	three half-tones	half-tone	
6	20	4	12	6	20	4	
E	F	G#	a	b	c	d#	e

- The arrangements of the intervals of the two scales coincide completely, and so do the arrangements of the tetrachords.
- The element γ, which in the modern system received the form ρ, occurs in exactly the same position, i.e. πα(=E). Γα(=G#), κε(=b).

1. The comparison is based on the half-tones, tones and three half-tones, not on the μόρια or κόμματα* of the modern system as this would be impossible.

*. See Δ.Γ. Παναγιωτοπούλου, θεωρία καὶ πράξις τῆς Βυζαντινῆς ἐκκλ. μουσικῆς, Athens 1947, p.50.

2. This scale starts from Πα(=D). To facilitate the comparison it is transposed upwards by one tone, thus Πα(=E), Βου(=F), Γα(=G), Δυ(=a), κε(=b), Ζω(=c), Νη(=d), Πα(=e).

- c) The element $\pi\alpha$ (=e) is likewise found in the expected position, i.e. on a.¹

Second possibility: a-flat

Accepting a-flat we must correspondingly have D-flat in the low tetrachord. The scale will then be:

Scale B:

C	D \flat	E	F	G	a \flat	b	c
half-tone	three half-tones	half-tone	tone	half-tone	three half-tones	half-tone	

As the figure demonstrates, the result is a chromatic scale similar to scale A but placed one third lower. This means that a chromatic scale is constructed which consists of two tetrachords, C-F and G-c, separated by the tone F-G.

Conclusions

- It appears from what has been said that the scale of the modes Deuterios, Pl. Deuterios and Nenano is chromatic.
- Whether a melody of the modes in question is transcribed in accordance with scale A or with scale B (lowered by one third) the result is the same.

The above conclusions presuppose the original hypothesis: that the element γ whether used alone or in combination with the λ (=αλδγλος) has the same implication wherever it occurs.

For this reason I directed my investigations towards manuscripts later than Sinai 1230 to see if they could provide more precise information.

For this purpose I used the manuscript Sinai 1301 (16th-17th c. according to Benesovic, Catalogus III,1. Petrograd 1917). This manuscript contains, among other things, the stichera of the month of September with melodies that appear to be virtually the same as those of the manuscript Sinai 1230. I have written down the MSi and MeSi of the melodies 11,12,13,14,16,21,22 and 23 of ms Sinai 1230 and next,

1. In the modern scale of the Pl. Deuterios mode the ρ occurs on Bou(=F), Zu(=c) and Πα(=e). In the melodies investigated there are no MeSi on these three pitches, and it is therefore not possible to compare them with their modern parallels.







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

below them the corresponding ones of Sinai 1301. I have left an empty space at the points at which one of the manuscripts does not have any MSi or MeSi. In front of each MeSi I have written the cadential note of the preceding cadence and after each MeSi I have written the initial note of the following opening formula.





Observations

The table shows that:



a) between E-E, G-G, b-b, MeSi occur as follows:

- 1) Sinai 1230 E  E. G  G. b  b
22) Sinai 1301 E  E. G  G. b  b¹

b) In Sinai 1230  occurs on E and on b, whereas  is only found on G.



c) In Sinai 1301  (= ) occurs on E, on G, and on b. Furthermore, between G-G or b-b we find  in some cases, but  in others.²


In my opinion these facts show that the element *y* has the same implication wherever it is found, i.e. it means that the interval above the degree on which it is found must be a half-tone. This view is further corroborated by the use of the element in question in the modern system of Byzantine music:



1. The MeSi  and  must be interpreted as expressing a melody as follows:



G  G = b-a-G. G  G = G-F-E-F-G.

b  b = d-c-b. b  b = b-a-G-a-b.






2. Similar instances occur a) in ms Sinai 1237 (17th c. according to Benesevic, Catalogus III, 1. Petrograd 1917), in which the  and  are sometimes found between E-E and at other times between G-G. For example:





f. 2r. 'Εκ ρέτης ἀγαθῆς... ἐνδοξαῖν G  G.

f. 2r. Τό μνημόσυνόν σου... ἵνα σοὶ εὐμενῶν E  E... καλός G  G

f. 11r. 'Ισοῦς ἐννομήτατος... Ἀνθίμε E  E... μυστήρια G  G

f. 14r. Βῆματι τυράννου... ἐκπαύλας... E  E.

b) In ms Athens 891 (A.D. 1787), in which MeSi  is found between E-E, G-G and b-b; MeSi , ,  are not used. The phthora  is found both on a and D.

c) In ms Athens 903 (A.D. 1782), in which MeSi , ,  are found on E, or G, or b. MeSi  is found only on G or b.

Scale of Deuterios mode.

γ	β	β	β	β	β	β	β
half-tone	three half-tones	half-tone	tone	half-tone	three half-tones	half-tone	

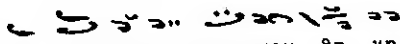
Scale of Plagal Deuterios mode.

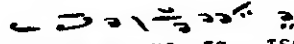
π	β	β	β	β	β	β	β
half-tone	three half-tones	half-tone	tone	half-tone	three half-tones	half-tone	

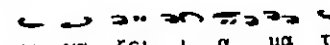
It is evident from the above scales that the element β (=y) invariably occurs on degrees above which there is a half-tone.

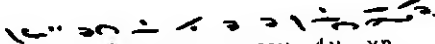
After all the above observations the conclusion must be drawn that the melodies of the modes Deuterios, Plagal Deuterios and Nenano under investigation are chromatic.

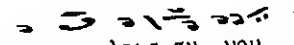
An example is presented below of a transcription of melody No.13 of the Deuterios mode according to the A chromatic scale (see above p. 101), i.e. C[#]-D -E -F -G[#]-a -b -c -d[#]-e 1

- 1 γ 

H των λει ψα νων σου θη κη.
b b a G[#]a bc a ba G[#]
- 2 γ 

παν ευ φη με πα τερ,
G[#] b a ba G[#]ab a
- 3 

κη γα ζει ι α μα τα.
a b ab G[#] aG[#] FE E
- 4 $\pi\gamma$ 

καλ η α γι α σου φυ χη
EF D G[#] b a G[#] ca bcba
- 5 

αγ γε λους συ νου σα,
G[#] b a ba G[#]ab a

1. According to the modern system of Byzantine music this scale when it descends two steps below the tonic (E) it descends diatonically i.e. C[#]-D-E corresponding to G[#]-a-b in the upper tetrachord.

2)ου τε ε ε ε ε ε I λ ε ρε ε ε ε ε ε ε ε 1
 βουβ νη γα#
 F D G#

3)ου τε ε ε ε ε ε λε ευ λ λ λ της 2
 βουβ νη γα#
 F D G#

4) και συν αυ τοις την α πω ω λει ει αν 3
 νη γα#
 D G#

b) Interval βουβ-κε (=F-b)

This interval was not found in the melodies under investigation. However it is found in a great number of cases in chromatic melodies of the modern Byzantine music system.

Examples :

1) ου με τα σχο ο ο ον τω ων 4
 βουβ κε
 F b

2)το ο ον I ου ου ου ου δα α 5
 δλ βουβ κε
 F b

3) ως θυ μλ λ λ α α α α λα α α α μα 6
 γα ζω
 F b

1. *ibid.* p.100

2. *ibid.* p.101

3. Γέννημα έχιδνῶν..., Δοξαστικόν εἰς τόν ἑσπερινόν τῆς Μ. Πέμπτης, ἦχος $\tilde{\alpha}^{\flat}$, *ibid.* p.197.

4. Μετὰ τὴν εἰς Ἀδου καθόδον..., Ἐωθινόν Ι', ἦχος $\tilde{\alpha}^{\flat}$, Ἀναστασιματῶριον (Ζωή), Athens 1961, p.283

5. Βουλευτήριον Σωτήρ..., Κάθισμα, ἦχος δ^{\flat} , Μουσικὸς Πανδέκτης (Ζωή), Τόμος Ζ' (τριώδιον), Athens 1937, p.160.

6. Κατευθυνθήτω ἡ προσευχή μου..., ἦχος $\tilde{\alpha}^{\flat}$, Μουσικὸς Πανδέκτης (Ζωή), Τόμος Α, Athens 1956, p.30. This example (6) belongs to a melody of the Deuterios mode and is chanted based on Δλ according to scale B (see above p.102).

c) Interval Δι-υη[#] (=a-d[#])¹

This interval, however, was found in 32 cases, in the melodies under research although in the modern system, as far as I know, it is not found at all. Instead of this, in the melodies of Pl. Deuterios mode, it is found in a great number of cases as the interval Δι-υη (=a-d). This originates from the previous interval i.e. Δι-υη[#], with the placing of a diatonic phthora on Δι(ϕ) or on υη(ζ). In this case the chromatic tetrachord κε-κα (=b-e) is changed into a diatonic one.

Examples:

1)	<p>Χρὶ στέ ε οὐ οὐ οὐ μα α θη η η ταυ 2</p> <p>δι υη</p> <p>a d</p>
2)	<p>δο ο ξα α α αν τας 3</p> <p>δι υη</p> <p>a d</p>
3)	<p>λα τρε ε ε ε λα τρε ε ευ ου σι 4</p> <p>δι υη βου κε</p> <p>a d F b</p>

The above examples show that the interval Δι-υη(=a-d) would reasonably justify the belief that it was a Δι-υη[#] (=a-d[#]) if there were no phthorai which define the kind of the tetrachord. The lack of phthorai in the melodies under investigation creates much difficulty in defining clearly the type of the aforementioned interval, as well as of many other intervals.

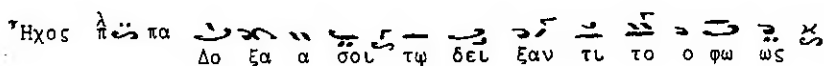
For example, the Doxology of Petros Lampadarios in the Pl. Deuterios mode, which is found in both the old and the modern method, can show us the difficulty of defining the type of intervals.

1 3,2.3,12.4,2.14,7.16,4.17,10...in all 32 cases.

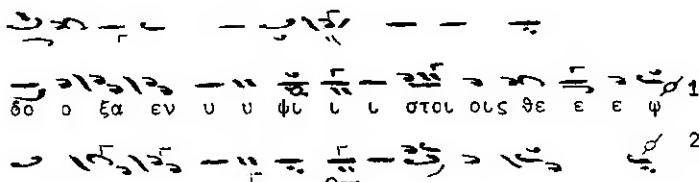
2 Μετὰ τὴν εἰς Ἀδου καθόδον..., Ἑωθινὸν Ι', Ἀναστασιματῶριον (Ζωή), Athens 1961.p.282.

3) Ἡ δυνως εἰρήνη σὺ Χριστέ..., Ἑωθινὸν ΣΤ', ibid.p.281.

4) Νῦν αἱ δυνάμεις τῶν οὐρανῶν..., χειρουβικὸν τῶν προηγουμένων, Πέτρου Λαμπαδαρίου, ἤχος ἦΰη, Μουσικὸς Πανδέκτης (Ζωή), Τόμος Α'. Athens 1958, p.64.



Roskilde f.180v.



As one can see from the modern melody above, the diatonic phthora of Δυ(ῶ) is placed over the syllable (ἐν ὧ) φῶ (στοις) and because of the phthora, the chromatic tetrachord κε-πα (=b-e) becomes diatonic until the syllable (θε) φ where, because of the chromatic phthora of Δυ(ϝ) the melody returns to the chromatic genus.

As it appears from the old melody below the modern one, the phthora δ does not exist; there is only the phthora ρ at the end of the musical line. Whether this phthora ρ indicates that the previous line should be chanted diatonically, or not, can not be ascertained. But if it should be chanted diatonically it still is not clear from what point the diatonic modulation must begin. I think that the solution to this problem can be obtained by collecting melodies of the old system transcribed into the modern one and then comparing them. Only in this way will it be possible to find those places in the melodies where such modulation occurs.

From the above, we can conclude that the existence of three tone intervals, i.e. D-G[#], F-b, a-d[#] does not rule out the conclusion that the melodies are chromatic.

B) In the line 7, we find the MeSi δ^{\sim} , followed by an opening formula starting from d. The problem here is to determine whether the note d is natural of $d^{\#}$. In the modern system there are cases where either exists.

1. Πανδέκτη, ἐν Κωνσταντινουπόλει (αωνα'), Τόμ. 2, p. 687.

2. 'Ανθολογία τῆς μουσικῆς περιέχουσα κατὰ τάξιν συλλογὴν τι-
να μαθημάτων τῶν ἀναγκασιωτέρων τῆς ἐκκλησιαστικῆς ἀκολου-
θίας (in the possession of J. Raasted), f.108v.

Examples:

- 1) π 1
μη η με την πο ο ορ νην.....
νη#
d#
- 2) π 2
υ δε ο των αμαρτανόντων.....
νη
d
- 3) π 3
ε θη καν ε πυ λ τη ην κεφαλην μου...
νη#
d#
- 4) π 4
γε ε νου το κυ ρι ε.....
νη
d
- 5) π 5
πα α α α α σαν την βιωτικην....
νη
d

From the above examples, it appears that after a chromatic cadence on $\kappa\alpha$ (=E) and a chromatic MeSi π an opening formula can follow starting with $\nu\eta^\#$ (=d[#]) or with $\nu\eta$ (=d). In the second case over the $\nu\eta$ (=d) a diatonic phthora (2) is placed. In line 7 of melody No. 13, the diatonic phthora does not exist (because as we previously said, in the melodies under research phthorai in general are not found) but the diatonic MeSi δ do exist.

Because of this, I have transcribed the opening note as well as all the other d^s of lines 7 and 8 as d natural instead of d[#].

In relation to the solution of this problem the same is true for the modulations as was previously asserted at the end of observation A.

1. 'Η ἀπεγνωσμένη διὰ τὸν βίον..., 'Ιδιόμελον Μ. Τετάρτης, ἤχος $\pi\alpha$, Μουσικὸς Πανδέκτης (Ζωή), Τόμος Ζ, Athens 1937 p. 174.
2. 'Ηρεωθυμένη τῇ ἀμαρτίᾳ..., 'Ιδιόμελον Μ. Τετάρτης, ἤχος $\pi\alpha$, *ibid* π. 172.
3. 'Εξέδυσαν τὰ ἱμάτιά μου..., Δοξαστικόν Μ. Παρασκευῆς, ἤχος $\pi\alpha$, *ibid*. p. 227.
4. Δοξολογία, ἤχος $\pi\alpha$, 'Αναστασιματάριον (Ζωή), Athens 1961, p. 285.
5. Χερουβικὸν Γρηγορίου Πρωτοφάλλτου, ἤχος $\pi\alpha$, Μουσικὸς Πανδέκτης (Ζωή), Τόμος Δ, Athens 1968, p. 64.

For the transcription of all the melodies into the chromatic genus, other problems certainly exist which cannot however be solved at present. The solution to these problems presupposes the transcription of much more material from the old into the new Byzantine notation and detailed comparison of the results. The lack of necessary sources especially from the modern system of Byzantine music, but also the limited time available to me does not permit me to continue research on this subject. I hope, however, that not only I especially should return to this subject but also that other researchers should deal with finding a definite solution to this problem.